

CLAIMS

1. A temperature control system for a workpiece chuck, comprising:
 - a circulating unit connected to the chuck for circulating a temperature control fluid through the chuck;
 - a refrigeration system in thermal communication with the temperature control fluid for controlling temperature of the temperature control fluid to control temperature in the chuck;
 - a fluid carrying system connected to the circulating unit and the chuck for circulating the temperature control fluid through the chuck; and
 - a controller coupled to the fluid carrying system for switching a flow path of the temperature control fluid such that the temperature control fluid at least partially bypasses the refrigeration system.
2. The temperature control system of claim 1, further comprising a heater in the chuck for heating the chuck.
3. The temperature control system of claim 1, wherein the refrigeration system comprises means for coupling hot gas around a first heat exchanger to a second heat exchanger to bypass at least partially the first heat exchanger to heat the temperature control fluid.
4. The temperature control system of claim 1, further comprising a fluid heater for heating the temperature control fluid.
5. The temperature control system of claim 4, further comprising means for switching the temperature control fluid to bypass at least partially the fluid heater.

1 6. A method of controlling temperature in a workpiece chuck, comprising:
2 connecting a circulating unit to the chuck to circulate a temperature
3 control fluid through the chuck;
4 coupling a refrigeration system to the temperature control fluid to control
5 temperature of the temperature control fluid to control temperature in the chuck;
6 connecting a fluid carrying system to the circulating unit and the chuck to
7 circulate the temperature control fluid through the chuck; and
8 controlling the fluid carrying system to switch a flow path of the
9 temperature control fluid such that the temperature control fluid at least partially
10 bypasses the refrigeration system.

1 7. The method of claim 6, further comprising providing a heater in the chuck for
2 heating the chuck.

1 8. The method of claim 6, further comprising coupling hot gas around a first heat
2 exchanger of the refrigeration system to a second heat exchanger of the
3 refrigeration system to bypass at least partially the first heat exchanger to heat the
4 temperature control fluid.

1 9. The method of claim 6, further comprising providing a fluid heater for heating
2 the temperature control fluid.

1 10. The method of claim 9, further comprising switching the temperature control
2 fluid to bypass at least partially the fluid heater.

1 11. A temperature control system for a workpiece chuck, comprising:
2 a circulating unit connected to the chuck for circulating a temperature
3 control fluid through the chuck;

a refrigeration system in thermal communication with the temperature control fluid for controlling temperature of the temperature control fluid to control temperature in the chuck, the refrigeration system including first and second heat exchangers for exchanging heat with the temperature control fluid; a fluid carrying system connected to the circulating unit and the chuck for circulating the temperature control fluid through the chuck; and a controller coupled to the refrigeration system for coupling hot gas around the first heat exchanger to the second heat exchanger to bypass at least partially the first heat exchanger to heat the temperature control fluid.

12. The temperature control system of claim 11, further comprising a heater in the chuck for heating the chuck.

13. The temperature control system of claim 11, further comprising a fluid heater for heating the temperature control fluid.

14. The temperature control system of claim 13, further comprising means for switching the temperature control fluid to bypass at least partially the fluid heater.

15. A method of controlling temperature in a workpiece chuck, comprising:
connecting a circulating unit to the chuck to circulate a temperature control fluid through the chuck;
connecting a fluid carrying system to the circulating unit and the chuck to circulate the temperature control fluid through the chuck;
coupling a refrigeration system to the temperature control fluid to control temperature of the temperature control fluid to control temperature in the chuck;
providing first and second heat exchangers in the refrigeration system for exchanging heat with the temperature control fluid; and

10 coupling hot gas around the first heat exchanger to the second heat
11 exchanger to bypass at least partially the first heat exchanger to heat the fluid.

1 16. The method of claim 15, further comprising providing a heater in the chuck for
2 heating the chuck.

1 17. The method of claim 15, further comprising providing a fluid heater for heating
2 the temperature control fluid.

1 18. The method of claim 17, further comprising switching the temperature control
2 fluid to bypass at least partially the fluid heater.

continued